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# A PRELIMINARY LIST OF THE MOIST FOREST ANGIOSPERM FLORA OF MWANIHANA FOREST RESERVE, TANZANIA<sup>1</sup>

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## ABSTRACT

*A preliminary survey of the Mwanihana Forest Reserve, Tanzania, has yielded 440 angiosperm species. These are listed systematically, and by habitat and habit. The forests are rich in species of restricted distribution, and have affinities to the Guineo-Congolian forests of western Africa.*

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The Mwanihana Forest Reserve has been the focus of biological study since the discovery of a new taxon of the primate *Cercopithecus galeritus* there in 1979 (Homewood & Rodgers, 1981), which prompted a proposal for the area to be given national park status (Rodgers & Homewood, 1982a). In the course of further study, a new species of sunbird (*Nectarinia rufipennis*) has been recorded from the forest (Jensen, 1983), and more than 40 new species of plants have been found. These include *Seychellaria africana*, which represents the first record of the family Triuridaceae from East Africa, and new species in the genera *Uvariopsis* and *Omphalocarpum*, which were not previously known from eastern Africa.

The following account is the result of botanical exploration of the forest in 1984 as part of a National Geographic Society expedition to the area in collaboration with the World Wildlife Fund Tanzania Forest Habitat Evaluation Project. Other aspects of the botany of the forest have been treated elsewhere (Lovett & Thomas, 1986).

The main area of study was the forest on the steep east-facing escarpment slopes above Sanje village at latitude 7°50'S and longitude 36°55'E. These slopes are the eastern edge of the Gologolo Mountains, which are the northern end of the Uzungwa range. In the study area the continuous altitudinal range of the forest is from 450 m to

1,760 m, but it is greater elsewhere on the escarpment. The rainfall is approximately 2,000–2,500 mm a year, with one wet season from November to May, when on average more than 100 mm of rain a month is received. There is a four-month dry season from July to October, when each month receives 50 mm of rain on average, and months of no rain are frequent. At higher altitudes there is a rich epiphytic bryophyte cover, indicating that a mist effect may be important in the water balance. The escarpment is dissected by steep-sided valleys separated by sharp ridge tops. The ridge tops are exposed, and so species normally occurring outside the forest habitat can be found within it. Some of the valley bottoms are flat, though nowhere particularly broad, and it is here that the forest is best developed. Elephant damage is common in the higher altitudes, and buffaloes are also present. Timber is being extracted by pit sawing, and in some areas there is considerable disturbance.

The angiosperm species recorded in the forest are arranged below according to habitat, habit, and in a systematic list. The habitat is divided into four types. The first three—Zanzibar-Inhambane Lowland Forest, Zanzibar-Inhambane Transitional Forest, and Afromontane Rain Forest—correspond to White's (1983) phytogeographic vegetation classification. The fourth division, Ridge Top Forest, is a specific vegetation type of restricted extent,

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being the highest ridge investigated in this study. This habitat is treated separately, as there are a number of species found only there, and it indicates which species of the Afromontane Rain Forest tend towards areas of greater exposure. The systematic list is divided into dicotyledons and monocotyledons, with families arranged alphabetically. Species and genera are arranged alphabetically within the families.

The list of species is far from complete, particularly for herbaceous and shrubby species. Many of the large trees were identified from sterile material gathered during the course of a quantitative ecological survey, and the determinations are included here because the canopy species are not often collected.

#### SPECIES ARRANGED ACCORDING TO HABITAT AND HABIT

The habitats follow the phytogeographical definitions given by White (1983) with the exception of Ridge Top Forest. Each habitat is given an altitudinal range and a short description of forest structure. The habit of each species is self-explanatory, except that it should be noted that a tree is a single-stemmed woody plant 10 m tall or at least 20 cm in diameter at breast height. The species are arranged alphabetically.

#### ZANZIBAR-INHAMBANE LOWLAND FOREST

Altitudinal range 450–750 m, canopy height 25–30 m with emergents to 40 m tall. Middle and shrub layer well developed. Herb layer sparse except in disturbed areas, where it is dominated by *Olyra latifolia*.

**TREES:** *Afrosersalisia cerasifera*, *Albizia adianthifolia*, *A. glaberrima* var. *glabrescens*, *A. zimmermannii*, *Allophylus melliodorus*, *Angylocalyx braunii*, *Aningeria pseudoracemosa*, *Anthocleista grandifolia*, *Antiaris toxicaria*, *Baphia semseiana*, *Bequaertiodendron natalense*, *Brachystegia microphylla*, *Calycosiphonia spathocalyx*, *Campylospermum sacleuxii*, *Casearia battiscombei*, *C. ?runssorica*, *Celtis durandii*, *Chaetacme aristata*, *Chionanthus mildbraedii*, *Craibia brevicaudata* subsp. *brevicaudata*, *Croton macrostachyus*, *C. cf. megalocarpoides*, *Dialium holtzii*, *Dichapetalum stuhlmannii*, *Diospyros brucei*, *D. mespiliformis*, *D. zombensis*, *Dracaena usambarensis*, *Drypetes natalensis*, *Elaeis guineensis*, *Enantia kummeriae*, *Erythrophleum suaveolens*, *Ficus cyathistipula* subsp. *cyathistipula*, *F. kirkii*, *F. lutea*, *F.*

*quibeba*, *F. sur*, *F. thonningii*, *Filicium decipiens*, *Funtumia africana*, *Garcinia buchananii*, *Haplocoeliopsis africana*, *Haplocoelum foliolosum*, *Harungana madagascariensis*, *Homalium longistylum*, *Inhambanella henriquesii*, *Khaya nyasica*, *Lagynias pallidiflora*, *Lecaniodiscus fraxinifolius*, *Lettowianthus stellatus*, *Ludia mauritiana*, *Macaranga capensis* var. *capensis*, *Malacantha alnifolia*, *Milicia excelsa*, *Monodora grandidieri*, *Newtonia paucijuga*, *Odyendea zimmermannii*, *Pachystela brevipes*, *Paramacrolobium coeruleum*, *Parinari excelsa*, *Parkia filicoidea*, *Phyllanthus inflatus*, *Placodiscus aff. amaniensis*, *Pteleopsis myrtifolia*, *Pterocarpus milbraedii* subsp. *usambarensis*, *Rhodognaphalon schumannianum*, *Ricinodendron heudelotii*, *Rothmannia fischeri* subsp. *fischeri*, *R. manganjae*, *Sapium ellipticum*, *Scheflerodendron usambarensis*, *Sorindeia madagascariensis*, *Stereospermum kunthianum*, *Suregada zanzibariensis*, *Tabernaemontana pachysiphon*, *Terminalia sambesiaca*, *Treculia africana*, *Trichoscypha ulugurensis*, *Trilepisium madagascariense*, *Uvariodendron gorgonis*, *Vangueriopsis longiflora*, *Vitellariopsis cuneata*, *Ziziphus pubescens*.

**SMALL TREES AND SHRUBS:** *Achyrospermum carvalhi*, *Allophylus perillei*, *Campylospermum sacleuxii*, *Carvalhoa campanulata*, *Chyranthus prieurianus* subsp. *longiflorus*, *Clerodendrum capitatum* var. *capitatum*, *Cremaspora triflora* subsp. *confluens*, *Crotonogynopsis usambarica*, *Didymosalpinx norae*, *Dorstenia kameruniana*, *Ixora tanzaniensis*, *Justicia interrupta*, *Leptactina platyphylla*, *Maytenus undata*, *Memecylon aff. myrtillioides*, *Olax gambecola*, *Pavetta ?mzeleziensis*, *P. stenosepala* subsp. *kisarawensis*, *Pleioceras orientale*, *Psychotria schliebenii*, *Psychotria livida*, *Rhus natalensis*, *Rinorea arborea*, *R. ferruginea*, *R. subintegrifolia*, *Sclerochiton obtusisepalus*, *Sloetiopsis usambarensis*, *Tarenna pavettoides* subsp. *affinis*, *Tricalysia pallens*.

**LIANES AND CLIMBERS:** *Cissus producta*, *Cnestis confertiflora*, *Culcasia orientalis*, *Entada pursaetha*, *Oncinotis tenuiloba*, *Rhoicissus revoilii*, *Salacia lovettii*, *Strychnos angolensis*, *Tetracera cf. litoralis*.

**HERBS:** *Aeolanthus holstii*, *Begonia wakefieldii*, *Brillantaisia madagascariensis*, *Bulbophyllum concatenatum*, *Cheirostylis lepida*, *Chlorophytum sparsiflorum*, *Coelachne africana*, *Crasscephalum crepidioides*, *Diodia sarmentosa*, *Disperis uzungwae*, *Geophila obvallata* subsp. *iodes*,

*Habenaria trilobulata*, *Impatiens joachimii*, *I. walleriana*, *Justicia glabra*, *J. interrupta*, *Lobelia cymbalarioides*, *L. inconspicua*, *Marantochloa leucantha*, *Mellera lobulata*, *Oldenlandia affinis*, *O. corymbosa* var. *caespitosa*, *Olyra latifolia*, *Pentas longituba*, *Phaulopsis imbricata*, *Pseuderanthemum tunicatum*, *Puelia olyrifloris*, *Saintpaulia ionantha*, *Scadoxus multiflorus*, *Scleria isostephana*, *S. racemosa*, *Sclerochiton obtusisepalus*, *Sida urens*, *Solanecio angulatus*, *Streptocarpus glandulosissimus*, *Utricularia striatula*.

#### ZANZIBAR-INHAMBANE TRANSITIONAL RAIN FOREST

Altitudinal range 750–1,200 m. Canopy height 25–30 m with emergents to 40 m tall. Taller trees are found in the valley bottoms than on the ridge tops. Middle and shrub layer well developed. Herb layer sparse except in disturbed areas, where it is dominated by a dense growth of Zingiberaceae and Piperaceae.

TREES: *Afrosersalisia cerasifera*, *Aidia micrantha* var. *msonju*, *Albizia adianthifolia*, *A. gummosifera*, *Allanblackia stuhlmannii*, *Aningeria pseudoracemosa*, *Anisophylla obtusifolia*, *Annonaceae* gen. nov., *Anthocleista grandifolia*, *Antiaris toxicaria*, *Antidesma vogelianum*, *Beilschmiedia kweo*, *Cassia angolensis*, *Cassipourea gummiflua*, *Celtis africana*, *Cephalosphaera usambarensis*, *Chrysophyllum gorungosanum*, *C. cf. lanceolatum*, *Cleistanthus polystachyus*, *Cola uloloma*, *Croton sylvaticus*, *Dalbergia boehmii* subsp. *boehmii*, *Dialium holtzii*, *Diospyros amaniensis*, *D. cf. troupinii*, *Dracaena usambarensis*, *Drypetes cf. arguta*, *D. reticulata*, *D. cf. roxburghii*, *D. usambarica* var. *trichogyna*, *Eugenia capensis*, *Funtumia africana*, *Garcinia volkensii*, *Glenniea africana*, *Grewia cf. barombiensis*, *Heinsenia diervilleoides*, *Homalium longistylum*, *Isolona hexaloba*, *Ixora scheffleri*, *Lagynias rufescens* subsp. *angustilobus*, *Leptactina platiphylla*, *Macaranga capensis* var. *capensis*, *Maesa lanceolata*, *Maranthes goetzeniana*, *Maytenus acuminata*, *Memecylon ?brenanii*, *Memecylon* sp. nov., *Mesogyne insignis*, *Milicia excelsa*, *Milletia ?elongistyla*, *Mimusops aedificatoria*, *Myrianthus holstii*, *Newtonia buchananii*, *Ochna holstii*, *Otoknema orientalis*, *Odyendea zimmermannii*, *Omphalocarpum* sp. nov., *Pancovia golungensis*, *Parinari excelsa*, *Parkia filicoidea*, *Phyllanthus inflatus*, *Polyceratocarpus scheffleri*, *Porteran-dia penduliflora*, *Rawsonia lucida*, *Rothmannia*

*urcelliformis*, *Sapium ellipticum*, *Sibangea pleioneura*, *Sorindeia madagascariensis*, *Strombosia scheffleri*, *Syzygium guineense* subsp. *afromontanum*, *Tabernaemontana pachysiphon*, *Tarenna pavettoides* subsp. *affinis*, *Trichilia dregeana*, *Trichoscypha ulugurensis*, *Trilepisium madagascariense*, *Uapaca paludosa*, *Vangueriopsis longiflora*, *Xylopia aethiopica*, *X. parvifolia*, *Xymalos monospora*, *Zantha golungensis*.

SMALL TREES AND SHRUBS: *Acalypha psilostachya* var. *psilostachya*, *Alchornea laxiflora*, *Allophylus perillei*, *Baissea* sp., *Brachystephanus africanus*, *Campylospermum reticulatum*, *Carpolobia* cf. *goetzei*, *Chassalia discolor*, *Clusena anisata*, *Dicranolepis usambarica*, *Dracaena laxissima*, *Erythrococca polyandra*, *Lagynias rufescens* subsp. *angustiloba*, *Lasianthus* sp. nov., *Leptonychia usambarensis*, *Lobelia longisepala*, *Mostuea brunonis* var. *brunonis*, *Ormocarpum* sp. nov., *Oxyanthus pyriformis* subsp. *tanganyikensis*, *O. speciosus* subsp. *stenocarpus*, *Pancovia holtzii*, *Pauridiantha* sp. nov., *Pavetta* sp., *Piper capense*, *P. umbellatum*, *Psychotria lauracea*, *P. schliebenii*, *P. tanganyicensis* var. *ferruginea*, *Pyrostria* sp. nov., *Rauvolfia mannii*, *Rhus longipes*, *Rinorea ferruginea*, *R. ilicifolia* var. *amplexicaulis*, *R. subintegriifolia*, *Schizozygia coffaeoides*, *Tricalysia pallens*, *T. sp. nov.*

LIANES AND CLIMBERS: *Agelaea heterophylla*, *Baissea myrtifolia*, *Culcasia falcifolia*, *Keetia venosa*, *Monanthotaxis buchananii*, *Salacia loettiae*, *S. madagascariensis*, *Tetracera* cf. *litoralis*, *Uncaria africana* var. *africana*, *Uvaria tanzaniae*.

HERBS: *Alectra kirkii*, *Begonia oxyloba* var. *kummeriae*, *Cheirostylis lepida*, *Costus subbiflorus*, *Dorstenia tayloriana* var. *laikipiensis*, *D. warneckeae*, *Geniosporum africanum*, *Impatiens confusa* subsp. *longicornu*, *Isoglossa lactea*, *Justicia aff. nyassana*, *J. pseudorungia*, *Leptaspis cochleata*, *Lobelia baumannii*, *L. inconspicua*, *Peperomia molleri*, *P. rotundifolia*, *Plectranthus* sp. = Schlieben 4215, *Pollia condensata*, *Rungia* sp. ?nov., *Solenostemon* sp. = *Mwasumbi* 2720, *Sphaerostephanos arbuscula* subsp. *africanus*, *Stenandriopsis warneckeae*, *Streptocarpus caulescens* var. *pallescens*, *Utricularia livida*.

HEMIPARASITES: *Englerina inaequilatera*.

#### AFROMONTANE RAIN FOREST

For ease of data presentation, Afromontane Rain Forest is taken here to include the forest type

defined as Afromontane Undifferentiated Forest by White (1983). Altitudinal range 1,200–1,700 m. In valleys and sheltered areas canopy height 25–30 m with emergents to 35 m tall. On ridges and exposed sites canopy height 15–25 m. Middle and shrub layers well developed in tall forest, middle layer not pronounced in exposed forest. Herb layer sparse in tall forest, dominated by Acanthaceae and Gramineae in more open areas.

TREES: *Agauria salicifolia* var. *pyrifolia*, *Albizia gummifera*, *Allanblackia stuhlmannii*, *A. ulugurensis*, *Alsodeiopsis schumannii*, *Aphloia theiformis*, *Beilschmiedia kweo*, *Bequaertiodendron magalismontanum*, *Bersama abyssinica*, *Brachylaena huillensis*, *Bridelia brideliifolia*, *Caloncoba welwitschii*, *Canthium captum*, *Casearia battiscombei*, *Cassipourea gummiflua*, *C. malosana*, *Chrysophyllum gorungosanum*, *Cleistanthus polystachyus*, *Coffea mongensis*, *Cola greenwayi*, *Craibia brevicaudata* subsp. *brevicaudata*, *Craterispermum longipedunculatum*, *Cryptocarya liebertiana*, *Diospyros amanensis*, *Drypetes cf. arguta*, *Faurea saligna*, *Ficalhoa laurifolia*, *Garcinia kingaensis*, *G. volkensii*, *Heinsenia diervilleoides*, *Hirtella megacarpa*, *Isoberlinia scheffleri*, *Isolona hexaloba*, *Ixora scheffleri* subsp. *scheffleri*, *Lasiodiscus usambarensis* var. *usambarensis*, *Macaranga capensis* var. *kilimandscharica*, *Maesa lanceolata*, *Maranthes goetziana*, *Maytenus acuminata*, *Memecylon ?brenanii*, *M. aff. semsei*, *Myrianthus holstii*, *Myrica salicifolia*, *Mystroxylon aethiopicum*, *Newtonia buchananii*, *Ochna holstii*, *O. kenyensis*, *Ocotea usambarensis*, *Olea capensis*, *Olinia rochetiana*, *Ouratea schusteri*, *Parinari excelsa*, *Pauridiantha paucinervis* subsp. *holstii*, *Phoenix reclinata*, *Polyceratocarpus scheffleri*, *Polyscias fulva*, *Psychotria aff. trichoclada*, *Psydrax parviflora* subsp. *rubrocostata*, *Rapanea melanophloeos*, *Rawsonia reticulata*, *Schrebera alata*, *Strombosia scheffleri*, *Strychnos mellodora*, *S. mitis*, *Syzygium cordatum*, *S. guineense* subsp. *afromontanum*, *S. masukuense*, *Trichocladus goetzei*, *Trichoscyphya ulugurensis*, *Uvariodendron* sp. nov., *Uvariopsis bisexualis*, *Vepris stolzii*, *Xylopia aethiopica*, *Xymalos monospora*, *Zantha golungensis*, *Zanthoxylum* sp.

SMALL TREES AND SHRUBS: *Acanthopale pubescens*, *Aidia micrantha* var. *msonju*, *Allophylus macrobotrys*, *Apodytes dimidiata* subsp. *acutifolia*, *Bertiera pauloi*, *Brillantaisia nyanzarum*, *Casearia gladiiformis*, *Chassalia parvifolia*, *Clutia abyssinica* var. *abyssinica*, *Coffea mufindien-*

*sis*, *Craterispermum longipedunculatum*, *Crotalaria unicella*, *Crotonogynopsis usambarica*, *Dissotis princeps* var. *princeps*, *Erythrococca sanjensis*, *E. ulugurensis*, *Garcinia volkensii*, *Isoglossa bracteosa*, *Lasianthus kilimandscharicus* subsp. *kilimandscharicus*, *L. peduncularis*, *Lasiodiscus usambarensis* var. *usambarensis*, *Leptonychia usambarensis*, *Maytenus mossambicensis* subsp. *mossambicensis*, *M. undata*, *Memecylon aff. amaniense*, *Memecylon* sp. nov., *Micrococca cf. holstii*, *Mimulopsis arborescens*, *M. kilimandscharica*, *Pauridiantha paucinervis* subsp. *holstii*, *P. sp. nov.*, *Pavetta lynesii*, *P. mshigeniana*, *P. nitidissima*, *P. stenosepala* subsp. *kisarawensis*, *Peddiea polyantha*, *Pseuderanthemum campylosiphon*, *Psychotria cryptogrammata*, *P. faucicola*, *P. goetzei*, *P. megalopus*, *P. zombamontana*, *P. sp. nov.*, *Rauvolfia mannii*, *Rinorea arborea*, *Rytigynia caudatisima*, *R. hirsutiflora*, *R. lichenoxenos* subsp. *glabrituba*, *Sclerochiton obtusisepalus*, *Sericanthe odoratissima* var. *ulugurensis*, *Solanum aff. schumannianum*, *Strychnos myrtoides*, *Tarenna uzungwaensis*, *Teclea nobilis*, *Tricalysia pallens*, *Trichilia* sp. nov., *Turrea holstii*, *Uvariopsis* sp. ?nov., *Xymalos monospora*.

LIANES AND CLIMBERS: *Asparagus asparagoides*, *Embelia schimperi*, *Schefflera myriantha*, *Tiliacora funifera*.

HERBS: *Aframomum laxiflorum*, *Alectra kirkii*, *Anisosepalum humbertii*, *Ardisiandra sibthorpioides*, *Begonia* sp. ?nov., *Bulbophyllum cf. imbricatum*, *Cheirostylis lepida*, *Cincinnobotrys oreophila*, *Cyperus pseudoleptocephalus*, *Disperis elaphoceras*, *Dissotis polyantha*, *Dorstenia denticulata*, *D. holstii*, *D. schliebenii*, *Gladiolus rupicola*, *Gymnosiphon usambaricus*, *Impatiens joachimii*, *I. kentrodonta*, *I. rubromaculata* subsp. nov., *I. sp. nov. aff. rubromaculata*, *Isoglossa lactea*, *Justicia pseudorungia*, *Liparis* sp. ?nov., *Lobelia baumannii*, *Medinilla engleri*, *Oldenlandia rupicola*, *Plectranthus* sp., *Polystachya ulugurensis*, *Saintpauliopsis lebrunii*, *Sclerochiton obtusisepalus*, *Seychellaria africana*, *Solenostemon* sp., *Streptocarpus glandulosissimus*.

HEMIPARASITES: *Englerina inaequilatera*.

#### RIDGE TOP FOREST

Altitude 1,760 m. Canopy height 3–6 m. Middle layer absent, the shrub layer composed of many small-diameter poles when under the canopy. Herb layer sparse under canopy, in open areas domi-

TABLE 1. *Taxa recently described from Mwanihana Forest Reserve.*

<i>Disperis elaphoceras</i> Verde.
<i>D. uzungwae</i> Verde.
<i>Drypetes usambarica</i> (Pax) Hutch. var. <i>trichogyna</i> A. R.-Sm.
<i>Erythrococca sanjensis</i> A. R.-Sm.
<i>Lagynias rufescens</i> (E. A. Bruce) subsp. <i>angustiloba</i> Verde.
<i>Pavetta nitidissima</i> Bridson
<i>Rytigynia caudatissima</i> Verde.
<i>R. hirsutiflora</i> Verde.
<i>Salacia lovettii</i> Halle & B. Mathew
<i>Seychellaria africana</i> Vollesen
<i>Tarenna uzungwaensis</i> Bridson
<i>Uvaria tanzaniae</i> Verde.
<i>Uvariopsis bisexualis</i> Verde.

nated by Gramineae and Pteridophyta. Rich epiphytic bryophyte cover.

TREES: *Afrosersalisia* sp. ?nov., *Allanblackia ulugurensis*, *Aphloia theiformis*, *Apodytes dimidiata* subsp. *acutifolia*, *Bequaertiodendron magalismontanum*, *Cryptocarya liebertiana*, *Diospyros whyteana*, *Faurea saligna*, *Garcinia kingensis*, *Isoberlinia scheffleri*, *Maytenus acuminata*, *Newtonia buchananii*, *Ochna holstii*, *Ocotea kenyensis*, *O. usambarensis*, *Olea capensis*, *Olinia rochetiana*, *Rapanea melanophloeos*, *Strychnos mitis*, *Syzygium cordatum*, *Ternstroemia polypetala* var. ?nov., *Trichocladus goetzei*.

SMALL TREES AND SHRUBS: *Agauria salicifolia* var. *pyrifolia*, *Clutia abyssinica* var. *abyssinica*, *Inula stuhlmannii*, *Pauridiantha paucinervis* subsp. *holstii*, *Phyllanthus hutchinsonianus*.

LIANES AND CLIMBERS: *Schefflera myriantha*.

HERBS: *Cryptotaenia calycina*, *Cynorkis anacamptoides*, *C. buchwaldiana* subsp. *braunii*, *C. pleistadenia*, *Polystachya cultriformis*, *P. ?goetzeana*, *P. melantha*, *P. transvaalensis*, *Saintpauliopsis lebrunii*, *Solanecio epidendricus*, *Stolzia leedalii*, *S. nyassana*, *Streptocarpus caulescens* var. *pallescens*, *Tridactyle* sp. nov., *T. sp. nov.* = *Leedal 6138*.

HEMIPARASITES: *Thesium triflorum*.

## DISCUSSION

The moist forests of eastern Tanzania and south-eastern Kenya are well known for the high number of species that are found only in that area (Lovett, 1988; Rodgers & Homewood, 1982b). The Mwanihana Forest Reserve is no exception, and a number of new species have been described recently from the locality (Table 1). Many other species are

TABLE 2. *Taxa in the Mwanihana Forest Reserve currently inadequately known to be described, or taxonomic research not yet completed. The following abbreviations are used to refer to collectors: DT = Duncan Thomas, DB = Diane Bridson, RP = Roger Polhill, JL = Jon Lovett. sn = sine numero sterile collections from the ecological survey.*

<i>Afrosersalisia</i> sp. ?nov., JL sn
Annonaceae ?gen. nov. = Ede 65, JL sn
<i>Begonia</i> sp. ?nov., DT 3797
<i>Bulbophyllum</i> cf. <i>imbricatum</i> , DT 3876
<i>Carpolobia</i> cf. <i>goetzei</i> , DT 3758
<i>Diospyros</i> cf. <i>troupinii</i> , JL sn
<i>Drypetes</i> aff. <i>arguta</i> , DT 3913
<i>Grewia</i> cf. <i>barombiensis</i> , DT 3747
<i>Impatiens joachimii</i> var. ?nov., DB 602, DT 3798, JL 271
<i>I. aff. rubromaculata</i> , DT 3846
<i>Justicia</i> aff. <i>nyassana</i> , DB 644
<i>Lasianthus</i> sp. nov., DB 650, DT 3759, JL 235
<i>Liparis</i> sp. ?nov., DT 3874
<i>Memecylon</i> aff. <i>amanicense</i> , DT 3850
<i>M. aff. brenanii</i> , DT 3760, DT 3916
<i>M. aff. myrtilloides</i> , RP 5118
<i>M. aff. semsei</i> , DT 3702
<i>M. sp. nov.</i> , DT 3773
<i>M. sp. nov.</i> , JL 215
<i>Omphalocarpum</i> sp. nov., DT 3652
<i>Ornocarpum</i> sp. nov., JL 384
<i>Pauridiantha</i> sp. nov., DB 648, DT 3680B, DT 3778, DT 3826, DT 3841
<i>Pavetta</i> sp. nov., JL 291
<i>Placodiscus</i> aff. <i>amanensis</i> , DT 3724
<i>Plectranthus</i> sp., DT 3823
<i>P. sp.</i> = Schlieben 4215, DB 640
<i>Psychotria</i> aff. <i>trichoclada</i> , DT 3836
<i>P. sp. nov.</i> , JL 294
<i>Rawsonia</i> aff. <i>lucida</i> , DT 3638, DT 3966
<i>Rinorea</i> aff. <i>arborea</i> , DT 3894
<i>Rungia</i> sp. ?nov., DT 3625
<i>Solanum</i> aff. <i>schumannianum</i> , DT 3896
<i>Solenostemon</i> sp. = <i>Mwasumbi</i> 2720, DB 641, DT 3771
<i>Tricalysia</i> sp. nov., DB 647
<i>Trichilia</i> sp. nov., JL 232
<i>Tridactyle</i> sp. nov., DT 3763A
<i>T. sp. nov.</i> = <i>Leedal 6138</i> , DT 3764
<i>Uvariodendron</i> sp. nov., JL 222
<i>Uvariopsis</i> sp. nov., DT 3921

inadequately known and more material is needed (Table 2). Undoubtedly further exploration will reveal still more novelties.

The occurrence of species in the Mwanihana Reserve that are only found on other similar mountains demonstrates that the forests of the ancient crystalline mountains of eastern Tanzania form a distinct floristic unit. Examples include *Angylocalyx braunii*, *Aningeria pseudoracemosa*, *Anisophyllea obtusifolia*, *Cephalosphaera usambarensis*, *Allanblackia stuhlmannii*, *Beilschmiedia kweo*, *Isoberlinia scheffleri*, *Newtonia pau-*

*cijuga*, *Polyceratocarpus scheffleri*, and *Saintpaulia ionantha*.

The forests also have links with west and central Africa. For example, the species *Cincinnobotrys oreophila*, *Crotonogynopsis usambarica*, *Isolona hexaloba*, *Olax gambecola*, *Puelia olyriformis*, *Rinorea subintegritifolia*, *Saintpauliopsis lebrunii*, *Schefflerodendron usambarensis*, and *Uapaca paludosa* are also found west of the arid corridor that separates the moist forests of eastern Tanzania from the Guineo-Congolian region. At a generic level *Enantia kummeriae*, *Uvariopsis bisexualis*, *Octoknema orientalis*, and *Polyceratocarpus scheffleri* are all restricted to eastern Tanzania but are of predominantly Guineo-Congolian genera.

Links to forests in the south are found in species such as *Diospyros whyteana* and *Syzygium masukuense*, while affinities with Madagascar and the Indian Ocean islands are found in the genera *Aphloia*, *Ludia*, and *Seychellaria*.

The reason for the high level of endemism in the eastern Tanzanian moist forests on ancient crystalline mountains is not difficult to explain. The mountains have probably been in existence since the Cretaceous (Sowerbutts, 1972), and Africa reached its present latitudinal position by the Oligocene (Axelrod & Raven, 1978). The area would therefore have been under the influence of a moist tropical climate for at least 40 million years. During the last 500,000 years there have been periods of pronounced aridity in continental Africa that correspond to glacial maxima (Imbrie & Imbrie, 1980; Pokras & Mix, 1987). During the last glacial maximum (18,000 years B.P.), the temperature of the equatorial Atlantic dropped 4–5°C (van Zinderen Bakker, 1982), whereas that of the Indian Ocean in the area of eastern Tanzania was similar to that at present (Prell et al., 1980). This suggests that during the last glacial maximum the climate of eastern Tanzania was similar to that at present, whereas west and central Africa went through a period of pronounced aridity with a corresponding reduction of forest area (Hamilton, 1982). If this situation reflects that of earlier glacial maxima, then the forests of eastern Tanzania have been remarkably stable in comparison with most of the Guineo-Congolian forests.

Consequently the high level of endemism can be explained by either the extinction of species over much of their range during periods of aridity but their survival in the eastern Tanzanian forests, or by evolution by isolation in the climatically stable eastern forests.

More difficult to explain are the affinities of the eastern Tanzanian forests with the Guineo-Congolian region and Madagascar. It is unclear how

far these are the results of long-distance dispersal or relicts of continuous forest links.

#### LITERATURE CITED

- AXELROD, D. I. & P. H. RAVEN. 1978. Late Cretaceous and Tertiary vegetation history of Africa. Pp. 77–130 in M. J. A. Werger (editor), Biogeography and Ecology of Southern Africa. W. Junk, The Hague.
- HAMILTON, A. C. 1982. Environmental History of Africa: A Study of the Quaternary. Academic Press, London.
- HOMEWOOD, K. M. & W. A. RODGERS. 1981. A previously undescribed mangabey from southern Tanzania. *Int. J. Primatol.* 2: 47–55.
- IMBRIE, J. & J. Z. IMBRIE. 1980. Modeling the climatic response to orbital variations. *Science* 207: 943–953.
- JENSEN, F. P. 1983. A new species of sunbird from Tanzania. *Ibis* 125: 447–449.
- LOVETT, J. C. 1988. Endemism and affinities of the Tanzanian montane forest flora. In: P. Goldblatt & P. P. Lowry II (editors), Modern Systematics in African Botany. Monogr. Syst. Bot. Missouri Bot. Gard. 25: 591–598.
- & D. W. THOMAS. 1986. The ecology of the pteridophytes in the Mwanihana Forest Reserve, Tanzania. *Fern Gaz.* 13: 103–107.
- POKRAS, E. M. & A. C. MIX. 1987. Earth's precession cycle and Quaternary climatic change in tropical Africa. *Nature* 326: 486–487.
- PRELL, W. L., W. H. HUTSON, D. F. WILLIAMS, A. W. H. BE, K. GEITZENAUER & B. MOLFINO. 1980. Surface circulation of the Indian Ocean during the last glacial maximum, approximately 18,000 yr BP. *Quaternary Res.* 14: 309–336.
- RODGERS, W. A. & K. M. HOMEWOOD. 1982a. Biological values and conservation prospects for the forests and primate populations of the Uzungwa Mountains, Tanzania. *Biol. Conserv.* 24: 285–304.
- & —. 1982b. Species richness and endemism in the Usambara mountain forests, Tanzania. *Biol. J. Linn. Soc.* 18: 192–242.
- SOWERBUTTS, W. T. C. 1972. Rifting in eastern Africa and the fragmentation of Gondwanaland. *Nature* 235: 435–436.
- WHITE, F. 1983. The Vegetation of Africa. UNESCO, Paris.
- ZINDEREN BAKKER, E. M. VAN. 1982. African paleoclimates 18,000 yrs BP. *Palaeoecol. Afr.* 15: 77–99.

#### APPENDIX I

Systematic list of collections. The following abbreviations are used to refer to collectors: DT = Duncan Thomas, DB = Diane Bridson, RP = Roger Polhill, JL = Jon Lovett. sn = *sine numero* sterile collections from the ecological survey.

#### ANGIOSPERMAE, DICOTYLEDONS

##### ACANTHACEAE

*Acanthopale pubescens* C. B. Cl., RP 5147

*Anisosepalum humbertii* (Mildbr.) E. Hossain, DT 3825, JL 299

*Brachystephanus africanus* S. Moore, DT 3684

- Brillantaisia madagascariensis* Lindau, DB 610  
*B. nyanzaru* Burkhill, DT 3790  
*Isoglossa bracteosa* Mildbr., RP 5146  
*I. lactea* Lindau s.l., DB 643, DT 3839  
*I. sp.* ?nov., JL 194  
*Justicia glabra* Roxb., JL 281  
*J. interrupta* (Lindau) C. B. Cl., DT 3664, RP 5124  
*J. aff. nyassana* Lindau, DB 644  
*J. pseudorungia* Lindau, DB 646, JL 316  
*Mellera lobulata* S. Moore, DB 592, RP 5156  
*Mimulopsis arborescens* C. B. Cl., DT 3789  
*M. kilimandscharica* Lindau, RP 5149  
*M. solmsii* Schweinf., RP 5148  
*Phaulopsis imbricata* (Forsskal) Sweet, DB 593  
*Pseuderanthemum campylosiphon* Mildbr., RP 5145  
*P. tunicatum* (Afzl.) Milne-Redh., DT 3671, JL 186, RP 5115  
*Rungia* sp. ?nov., DT 3625  
*Saintpauliopsis lebrunii* Staner, DT 3805, DT 3898, JL 310  
*Sclerochiton obtusisepalus* C. B. Cl., DB 591, DB 618, DT 3674, DT 3905, JL 315, RP 5114  
*Stenandriopsis warneckei* (S. Moore) Napper, JL 274  
*Whitfieldia elongata* (P. Beauv.) C. B. Cl., DT 3663, RP 5120

## ANACARDIACEAE

- Rhus longipes* Engl., DT 3653, DT 3953  
*R. natalensis* Krauss, DT 3669  
*Sorindeia madagascariensis* DC., DB 639, DB 639A, DT 3610, DT 3639, JL 190  
*Trichoscypha ulugurensis* Mildbr., JL 180

## ANNONACEAE

- Enantia kummeriae* Engl. & Diels, JL sn  
*Isolona hexaloba* (Pierre) Engl. & Diels, RP 5143  
*I. sp.*, DT 3899  
*Lettowianthus stellatus* Diels, DT 3753, DT 3937  
*Monanthotaxis buchananii* (Engl.) Verdc., DT 3624, DT 3644  
*Monodora grandidieri* Baill., JL sn  
*Polyceratocarpus scheffleri* Engl. & Diels, DT 3656, DT 3698  
*Uvaria tanzaniae* Verdc., DT 3641  
*Uvariodendron gorgonis* Verdc., JL sn  
*U. sp. nov.*, JL 222  
*Uvariopsis bisexualis* Verdc., DT 3921, JL 233  
*Xylopia aethiopica* (Dunal) A. Rich., JL sn  
*X. parviflora* (A. Rich.) Benth., JL sn  
*Annonaceae gen. nov.* = Ede 65, JL sn

## APOCYNACEAE

- Baissea myrtifolia* (Benth.) Pichon, DT 3645  
*Carvalhoa campanulata* K. Schum., JL 183  
*Funtumia africana* (Benth.) Stapf, DT 3741  
*Oncinotis tenuiloba* Stapf, DT 3718  
*Pleioceras orientale* Vollesen, JL 179  
*Rauvolfia mannii* Stapf, DT 3791, JL 212  
*Schizozygia coffaeoides* Baill., DB 645, DT 3754  
*Strophanthus petersianus* Klotzsch, DB sn  
*Tabernaemontana pachysiphon* Stapf, JL 211

## ARALIACEAE

- Polyscias fulva* (Hiern) Harms, JL sn  
*Schefflera myriantha* (Baker) Drake, JL sn

## BALSAMINACEAE

- Impatiens confusa* Grey-Wilson subsp. *longicornu* Grey-Wilson, DT 3618  
*I. joachimii* G. M. Schulze var. ?nov., DB 602, DT 3798, JL 271  
*I. kentrodonta* Gilg, DT 3672, DT 3772  
*I. rubromaculata* Warb., subsp. nov., DT 3769  
*I. aff. rubromaculata* Warb., DT 3846  
*I. walleriana* Hook. f., DB 603

## BEGONIACEAE

- Begonia oxyloba* Welw. var. *kummeriae* (Gilg) Irmscher, DT 3617  
*B. wakefieldii* Gilg, JL 272  
*B. sp.* ?nov., DT 3797

## BIGNONIACEAE

- Stereospermum kunthianum* Cham., JL sn

## BOMBACACEAE

- Rhodognaphalon schumannii* A. Robyns, JL sn

## CELASTRACEAE

- Maytenus acuminata* (L. f.) Loess, DT 3643, DT 3810  
*M. mossambicensis* (Klotzsch) Blakelock var. *mossambicensis*, DT 3903  
*M. undata* (Thunb.) Blakelock, DB 601, DB 628, RP 5152, JL 187  
*Mystroxylon aethiopicum* (Thunb.) Loes, DT 3879, DT 3902  
*Salacia erecta* (G. Don) Walp., DB sn  
*S. lovetii* Halle & B. Mathew, DB 638, DB 655, JL 216  
*S. madagascariensis* (Lam.) DC., DT 3642

## CHRYSOBALANACEAE

- Hirtella megacarpa* R. Graham, DT 3901  
*Maranthes goetzeniana* (Engl.) Prance, JL sn  
*Parinari excelsa* Sabine, JL sn

## COMBRETACEAE

- Pteleopsis myrtifolia* (Laws.) Engl. & Diels, JL sn  
*Terminalia sambesica* Engl. & Diels, DT 3719

## COMMELINACEAE

- Pollia condensata* C. B. Cl., JL 279

## COMPOSITAE

- Brachylaena huillensis* O. Hoffm., JL sn  
*Crassocephalum crepidioides* (Benth.) S. Moore, DB 621  
*Inula stuhlmannii* O. Hoffm., DT 3928  
*Solanecio angulatus* (Vahl) C. Jeffrey, DB 620  
*S. epidendricus* (O. Hoffm.) C. Jeffrey, DT 3840, DT 3847B

## CONNARACEAE

- Agelaea heterophylla* Gilg, JL sn  
*Cnestis confertiflora* Gilg, JL sn

## DICHRAPETALACEAE

- Dichrapetalum stuhlmannii* Engl., DT 3728

DILLENIACEAE

*Tetracera cf. litoralis* Gilg, DB 594, DT 3632

EBENACEAE

*Diospyros amanensis* Guerke, DT 3788

*D. brucei* F. White, JL sn

*D. mespiliformis* Hochst. ex A. DC., JL sn

*D. cf. troupinii* F. White, JL sn

*D. whyteana* (Hiern) F. White, DT 3927

*D. zombensis* (B. L. Burtt) F. White, JL sn

ERICACEAE

*Agauria salicifolia* (Lam.) Oliver var. *pyrifolia* (Pers.)  
Oliver, DT 3926, JL 3096

EUPHORBIACEAE

*Acalypha psilotachya* Hochst. ex A. Rich. var. *psilotachya*, DT 3690

*Alchornea laxiflora* (Benth.) Pax & K. Hoffm., DT 3636

*Antidesma vogelianum* Muell. Arg., DT 3752

*Bridelia brideliifolia* (Pax) Fedde, DT 3900

*Cleistanthus polystachyus* Hook. f. ex Planchon, JL sn

*Clutia abyssinica* Jaub. & Spach var. *abyssinica*, DT  
3707, DT 3708, JL 300

*Croton macrostachyus* Hochst. ex Del., JL sn

*C. cf. megalocarpoides* Friis & M. Gilbert, DT 3727

*C. sylvaticus* Hochst. ex Krauss, DT 3756

*Crotonogynopsis usambarica* Pax, DT 3761, DT 3924,  
RP 5129

*Drypetes natalensis* (Harvey) Hutch., JL sn

*D. reticulata* Pax, JL sn

*D. usambarica* (Pax) Hutch. var. *trichogyna* A. R.-Sm.,  
JL 219

*D. ?arguta* (Muell. Arg.) Hutch., DT 3913

*D. cf. roxburghii* (Wall.) Hurusawa, JL sn

*Erythrococca polyandra* (Pax & K. Hoffm.) Prain, DT  
3751

*E. sanjensis* A. R.-Sm., DT 3677, DT 3774, DT 3775,  
DT 3782, DT 3783

*E. ulugurensis* A. R.-Sm., DT 3762, DT 3770

*Macaranga capensis* Baill. var. *capensis*, DT 3739

*M. capensis* Baill. var. *kilimandscharica* (Pax) Friis &  
M. Gilbert, JL sn

*Micrococca cf. holstii* (Pax) Prain, DT 3833

*Phyllanthus hutchinsonianus* S. Moore, DT 3803

*P. inflatus* Hutch., DT 3609, JL 181

*Ricinodendron heudelotii* (Baill.) Pierre ex Pax, JL sn

*Sapium ellipticum* (Hochst.) Pax, JL sn

*Sibangea pleioneura* A. R.-Sm., DT 3651, JL 221

*Suregada zanzibariensis* Baill., DT 3613

*Uapaca paludosa* Aubrév. & Léandri, JL sn

FLACOURTIACEAE

*Aphloia theiformis* (Vahl.) Benn., DT 3705

*Caloncoba welwitschii* (Oliver) Gilg, JL sn

*Casearia battiscombei* R. E. Fr., JL sn

*C. gladiiformis* Mast., DT 3776

*C. ?runssorica* Mildb., DT 3773, DT 3755

*Homalium longistylum* Mast., JL sn

*Ludia mauritiana* Gmelin, Dt 3936

*Rawsonia lucida* Harvey & Sonder, DT 3650

*R. aff. lucida* Harvey & Sonder, DT 3638, DT 3966

*R. reticulata* Gilg, DT 3835, JL 290

GESNERIACEAE

*Saintpaulia ionantha* H. Wendl., RP 5130

*Streptocarpus caulescens* Vatke var. *pallescens* Engl.,  
DT 3620, DT 3847

*S. glandulosissimus* Engl., DB 604, DT 3848, RP 5155

GUTTIFERAE

*Allanblackia stuhlmannii* (Engl.) Engl., JL sn

*A. ulugurensis* Engl., JL sn

*Garcinia buchananii* Baker, JL sn

*G. kingensis* Engl., DT 3853

*G. volkensii* Engl., DT 3649, DT 3912

*Harungana madagascariensis* Poiret, JL sn

HAMAMELIDACEAE

*Trichocladus goetzei* Engl., JL sn

ICACINACEAE

*Alsodeiopsis schumannii* (Engl.) Engl., DT 3915

*Apodytes dimidiata* E. Meyer ex Arn. subsp. *acutifolia*  
(Hochst. ex A. Rich.) Cuf., DT 3715, DT 3766

LABIATAE

*Achyrospermum carvalhi* Guerke, DB 598

*Aeolanthus holstii* Guerke s.l., DB 617

*Geniosporum africanum* P. Beauv., DB 635

*Plectranthus* sp., DT 3823

*P. sp.* = Schlieben 4215, DB 640

*Solenostemon* sp. ?= *Mwasumbi* 2720, DB 641, DT  
3771

LAURACEAE

*Beilschmiedia kweo* (Mildbr.) A. Robyns & Wilczek, DT  
3882

*Cryptocarya libertiana* Engl., JL sn

*Ocotea kenyensis* (Chiov.) A. Robyns & Wilczek, DT  
3907

*O. usambarensis* Engl., JL 301

LEGUMINOSAE

Caesalpinoideae

*Brachystegia microphylla* Harms, DT 3612

*Cassia angolensis* Hiern, JL sn

*Dialium holtzii* Harms, DT 3732, DT 3740

*Erythrophleum suaveolens* (Guill. & Perr.) Brenan, JL sn

*Isoberlinia scheffleri* (Harms) Greenway, JL sn

*Paramacrolobium coeruleum* (Taubert) Leonard, JL sn

Mimosoideae

*Albizia adianthifolia* (Schumach.) W. F. Wight, DT  
3646

*A. glaberrima* (Schumach. & Thonn.) Benth. var. *gla-*  
*brescens* (Oliver) Brenan, DT 3734

*A. gummifera* (J. Gmelin) C. A. Sm., DT 3735A, DT  
3736

*A. zimmermannii* Harms, DT 3640, DT 3731

*Entada pursaetha* DC., JL sn

*Newtonia buchananii* (Baker) Gilb. & Bout., JL sn

*N. paucijuga* (Harms) Brenan, DT 3723

*Parkia filicoidea* Welw. ex Oliver, DT 3735

## Papilioideae

- Angylocalyx braunii* Harms, DT 3729  
*Baphia semseiana* Brummitt, DT 3668  
*Craibia brevicaudata* (Vatke) Dunn subsp. *brevicaudata*, DT 3730  
*Crotalaria unicella* Lam., RP 5139  
*Dalbergia boehmii* Taub. subsp. *boehmii*, DT 3623  
*Millettia ?elongatistyla* Gillett, DT 3746  
*Ormocarpum* sp. nov., JL 384  
*Pterocarpus mildbraedii* Harms subsp. *usambarensis* (Verdc.) Polh., JL sn  
*Schefflerodendron usambarensis* Harms, JL sn

## LENTIBULARIACEAE

- Utricularia livida* E. Meyer, DT 3648  
*U. striatula* Sm., DB 605, RP 5121

## LOBELIACEAE

- Lobelia baumannii* Engl., DB 642, DT 3804  
*L. cyambalariaeoides* Engl., DB 606  
*L. inconspicua* A. Rich., DB 607, DT 3621  
*L. longisepala* Engl., DT 3616

## LOGANIACEAE

- Anthocleista grandiflora* Gilg, JL sn  
*Mostuea brunonis* Didr. var. *brunonis*, DT 3637  
*Strychnos angolensis* Gilg, JL 276  
*S. mellodora* S. Moore, JL sn  
*S. mitis* S. Moore, JL sn  
*S. myrtoides* Gilg & Busse, DT 3829

## LORANTHACEAE

- Englerina inaequilatera* (Engl.) Balle ex Polh. & Wiens, DT 3830, JL 288, JL 299

## MALVACEAE

- Sida urens* L., DB 633

## MELASTOMATACEAE

- Cincinnobotrys oreophila* Gilg, DT 3877  
*Dissotis polyantha* Gilg, DT 3794  
*D. princeps* (Kunth.) Triana var. *princeps*, RP 5141  
*Medinilla ?engleri* Gilg, DT 3832  
*Memecylon ?brenanii* A. & R. Fernandes, DT 3760, DT 3916  
*M. aff. amaniense* (Gilg) A. & R. Fernandes, DT 3850  
*M. aff. myrtilloides* Markgraf, RP 5118  
*M. aff. semsei* A. & R. Fernandes, DT 3702  
*M. sp. nov.* DT 3773  
*M. sp. nov.* JL 215

## MELIACEAE

- Khaya nyasica* Stapf ex Baker f., JL sn  
*Trichilia dregeana* Sonder, JL sn  
*T. sp. nov.*, JL 232  
*Turraea holstii* Guerke, DT 3714

## MELIANTHACEAE

- Bersama abyssinica* Fresen., JL sn

## MENISPERMACEAE

- Tiliacora funifera* (Miers) Oliver, DT 3914

## MONIMIACEAE

- Xymalos monospora* (Harvey) Baill., DT 3786, DT 3787, DT 3843

## MORACEAE

- Antiaris toxicaria* Lesch., JL sn  
*Dorstenia denticulata* A. Peter, RP 5151  
*D. holstii* Engl., RP 5153  
*D. kameruniana* Engl., RP 5119  
*D. schliebenii* Mildbr., DT 3796  
*D. tayloriana* Rendle var. *laikipiensis* (Rendle) Hijman, JL 213  
*D. warneckei* Engl., DT 3660  
*Ficus cyathistipula* Warb. subsp. *cyathistipula*, DT 3666  
*F. kirkii* Hutch., JL sn  
*F. lutea* Vahl, JL sn  
*F. quibeba* Welw. ex Ficalho, JL 184  
*F. sur* Forsskal, JL sn  
*F. thonningii* Blume, JL sn  
*Mesogyne insignis* Engl., JL 231  
*Milicia excelsa* (Welw.) Berg, JL sn  
*Myrianthus holstii* Engl., DT 3757  
*Sloetiopsis usambarensis* Engl., DT 3670, DT 3726  
*Treculia africana* Decne., JL sn  
*Trilepisium madagascariensis* DC., JL sn

## MYRICACEAE

- Myrica salicifolia* Hochst. ex A. Rich., JL sn

## MYRISTICACEAE

- Cephalosphaera usambarensis* (Warb.) Warb., DT 3619

## MYRSINACEAE

- Embelia schimperi* Vatke, JL sn  
*Maesa lanceolata* Forsskal, DT 3897  
*Rapanea melanophloeos* (L.) Mez, JL sn

## MYRTACEAE

- Eugenia capensis* (Ecklon & Zeyher) Sonder, JL sn  
*Syzygium cordatum* Hochst. ex Krauss, JL sn  
*S. guineense* (Willd.) DC. subsp. *afromontanum* F. White, JL sn  
*S. masukuense* (Baker) R. E. Fries, JL sn

## OCHNACEAE

- Campylospermum reticulatum* (P. Beauv.) Farron, JL 214  
*C. sacleuxii* (Tieghem) Farron, DT 3939, JL 217, RP 5122  
*Ochna holstii* Engl., DT 3738, DT 3922  
*Ouratea schusteri* Gilg ex Engl., DT 3834

## OLACACEAE

- Octoknema orientalis* Mildbr., JL 287  
*Olax gambecola* Baill., RP 5117  
*Strombosia scheffleri* Engl., JL sn

## OLEACEAE

- Chionanthus mildbraedii* (Gilg & Schellenb.) Stearn, RP 5123  
*Olea capensis* L., JL sn  
*Schrebera alata* (Hochst.) Welw., DT 3904

OLINIACEAE

*Olinia rochetiana* A. Juss., JL sn

PIPERACEAE

*Peperomia molleri* C. DC., DT 3692, RP 5142

*P. rotundifolia* (L.) Kunth., DT 3622

*Piper capense* L. f., JL sn

*P. umbellatum* L., JL 234

POLYGALACEAE

*Carpolobia* cf. *goetzei* Guerke, DT 3758

PRIMULACEAE

*Ardisiandra sibthorpioides* Hook. f., DT 3799

PROTEACEAE

*Faurea saligna* Harvey, DT 3703

RHAMNACEAE

*Lasiodiscus usambarensis* Engl. var. *usambarensis*, DT 3828

*Ziziphus pubescens* Oliver, JL sn

RHIZOPHORACEAE

*Anisophyllea obtusifolia* Engl. & Brehm., JL sn

*Cassipourea gummiflua* Tul., JL sn

*C. malosana* (Baker) Alston, JL sn

RUBIACEAE

*Aidia micrantha* (K. Schum.) F. White var. *msonju* (Krausse) Petit, DT 3679

*Bertiera pauloi* Verdc., DT 3842, DT 292

*Calycosiphonia spathocalyx* (K. Schum.) Robbrecht, DB 658, JL 269

*Canthium captum* Bullock, JL sn

*Chassalia discolor* K. Schum., JL 220

*C. parviflora* K. Schum., DT 3838

*Coffea mongensis* Bridson, JL sn

*C. mufindiensis* Hutch. ex Bridson, DT 3819, DT 3914A

*Craterispermum longipedunculatum* Verdc., DT 3784, DT 3827

*Cremaspora triflora* (Thonn.) K. Schum. subsp. *confluens* (K. Schum.) Verdc., DB 624

*Didymosalpinx norae* (Swynnerton) Keay, DB 623

*Diodia sarmentosa* Sm., DB 632

*Geophila obvallata* (Schumach.) F. Dindr. subsp. *iodes* K. Schum., JL 275

*Heinsenia diervilleoides* K. Schum., DT 3822

*Ixora scheffleri* K. Schum. & K. Krausse subsp. *scheffleri*, DT 3852

*I. tanzaniensis* Bridson, DB 626, RP 5116

*Keetia venosa* (Oliver) Bridson, DT 3608

*Lagynias pallidiflora* Bullock, DB 612

*L. rufescens* (E. A. Bruce) Verdc. subsp. *angustiloba* Verdc., DB 649, JL 289

*Lasianthus kilimandscharicus* K. Schum. subsp. *kili-*  
*mandscharicus*, JL sn

*L. peduncularis* E. A. Bruce, DT 3777

*L. sp.* nov., DB 650, DT 3759, JL 235

*Leptactina platyphylla* (Hiern) Wernham, DB 653, DT 3721

*Oldenlandia affinis* (Roemer & Schultes) DC., DB 597  
*O. corymbosa* L. var. *caespitosa* (Benth.) Verdc., DB 616

*O. rupicola* (Sonder) Kuntze, DT 3800

*Oxyanthus pyriformis* (Hochst.) Skeels subsp. *tangan-*  
*yikensis* Bridson, DB 636, DT 3745

*O. speciosus* DC. subsp. *stenocarpus* (K. Schum.) Brid-  
son, DB 651

*Pauridiantha bridelioides* Verdc., DB sn

*P. paucinervis* (Hiern) Bremek. subsp. *holstii* (K. Schum.)  
Verdc., DB 569, DT 3831

*P. sp.* nov., DB 648, DT 3680B, DT 3778, DT 3826,  
DT 3841

*Pavetta lynesii* Bridson, DT 3717, DT 3837

*P. mshigeniana* Bridson, DT 8678

*P. nitidissima* Bridson, DT 3851

*P. stenosepala* K. Schum. subsp. *kisarawensis* (Bremek.)  
Bridson, DB 599, JL 210, JL 308

*P. ?mzeleziensis* Bridson, DB 625

*P. sp.*, JL 291

*Pentas longituba* K. Schum., DB 596

*Porterandia penduliflora* (K. Schum.) Keay, DT 3611

*Psychotria cryptogrammata* Petit, JL 227

*P. faucicola* K. Schum., DT 3844

*P. goetzei* (K. Schum.) Petit, DT 3716

*P. lauracea* (K. Schum.) Petit, DB 637

*P. megalopus* Verdc., DT 3910

*P. meridiano-montana* Petit var. *angustifolia* Petit, DT  
3710

*P. schliebenii* Petit, DB 627

*P. tanganyicensis* Verdc. var. *ferruginea* Verdc., JL 278

*P. aff. trichoclada* Petit, DT 3836

*P. sp.*, JL 294

*Sydrax livida* (Hiern) Bridson, DB 586, DB 587, DB  
588

*P. parviflora* (Afz.) Bridson subsp. *rubrocostata* (Robyns)  
Bridson, JL sn

*Pyrostria* sp. nov., DT 3942

*Rothmannia fischeri* (K. Schum.) Bullock subsp. *fischeri*,  
JL 178

*R. manganae* (Hiern) Keay, JL sn

*R. urcelliformis* (Schweinf. ex Hiern) Bullock ex Robyns,  
DT 3748

*Rytigynia caudatissima* Verdc., DT 3781

*R. hirsutiflora* Verdc., DT 3811

*R. lichenoxenos* (K. Schum.) A. Robyns subsp. *glabri-*  
*tuba* Verdc., DT 3779

*R. pseudolongicaudata* Verdc., DT 3780

*Sericanthe odoratissima* (K. Schum.) Robbrecht var. *ulu-*  
*gurensis* Robbrecht, DT 3680A, DT 3711

*Tarenna pavettoides* (Harvey) Sim subsp. *affinis* (K.  
Schum.) Bridson, DB 629, DT 3614, DT 3750

*T. uzungwaensis* Bridson, DT 3785

*Tricalysia pallens* Hiern, DB 595, DB 595A, DB 600,  
DB 611, DB 630, DT 3607, DT 3615, DT 3712, DT  
3737

*T. sp.* nov., DB 647

*Uncaria africana* G. Don var. *africana*, DT 3758A

*Vangueriopsis longiflora* Verdc., JL sn

RUTACEAE

*Clausena anisata* (Willd.) Benth., DT 3941

*Teclea nobilis* Del., DT 3906

*Vepris stolzii* Verdoorn, DT 3713

*Zanthoxylum* sp., JL sn

## SANTALACEAE

*Thesium triflorum* Thunb., DT 3809, JL 309

## SAPINDACEAE

- Allophylus macrobotrys* Gilg, DT 3792  
*A. melliodorus* Gilg ex Radlk., JL sn  
*A. pervillei* Blume, DB 656, DT 3635  
*Chytranthus prieurianus* Baill. subsp. *longiflorus* (Verdc.)  
 Halle, DT 3940, JL 189  
*Deinbollia* sp., JL sn  
*Filicium decipiens* (Wight & Arn.) Thw., JL sn  
*Glenniea africana* (Radlk.) Leenh., DT 3749  
*Haplocoelopsis africana* F. Davis in MS, JL sn  
*Haplocoelum foliolosum* (Hiern) Bullock, JL sn  
*Lecaniodiscus fraxinifolius* Baker, JL sn  
*Pancovia golungensis* (Hiern) Excell & Mendonca, JL sn  
*P. holtzii* Radlk., DT 3633  
*Placodiscus* aff. *amaniensis* Radlk., DT 3724  
*Zantha golungensis* Hiern, JL sn

## SAPOTACEAE

- Afrosarsalia cerasifera* (Welw.) Aubrév., DT 3628  
*Afrosarsalia* sp. ?nov., JL sn  
*Aningeria pseudoracemosa* J. Hemsley, DT 3725  
*Bequaertiodendron magalismontanum* (Sonder) Heine  
 & J. Hemsley, JL sn  
*B. natalense* (Sonder) Heine & J. Hemsley, DT 3606  
*Chrysophyllum gorungosanum* Engl., JL sn  
*C. cf. lanceolatum* (Bl.) DC., JL sn  
*Inhambanella henriquesii* (Engl. & Warb.) Dubard, JL sn  
*Malacantha alnifolia* (Baker) Pierre, JL sn  
*Mimusops aedificatoria* Mildbr., DT 3845  
*Omphalocarpum* sp. nov., DT 3652  
*Pachystela brevipes* (Baker) Engl., JL sn  
*Vitellariopsis cuneata* (Engl.) Aubrév., DT 3662

## SCROPHULARIACEAE

*Alectra kirkii* Hemsley, DT 3631, RP 5140

## SIMAROUBACEAE

*Odyenda zimmermannii* Engl., JL sn

## SOLANACEAE

*Solanum* aff. *schumannianum* Dammer, DT 3896

## STERCULIACEAE

- Cola greenwayi* Brenan, JL sn  
*C. uloloma* Brenan, JL sn  
*Leptonychia usambarensis* K. Schum., DT 3657, DT  
 3795

## THEACEAE

- Ficalhoa laurifolia* Hiern, JL sn  
*Ternstroemia polypetala* Melchior, var. ?nov., DT 3767

## THYMELAEACEAE

- Dicranolepis usambarica* Gilg, JL sn  
*Peddiea polyantha* Gilg, DT 3701

## TILIACEAE

*Grewia* cf. *barombiensis* K. Schum., DT 3747

## ULMACEAE

- Celtis africana* Burm. f., JL sn  
*C. durandii* Engl., JL sn  
*Chaetacme aristata* Planchon, JL sn

## UMBELLIFERAE

*Cryptotaenia calycina* C. C. Townsend, DT 3806

## VERBENACEAE

- Clerodendrum capitatum* Schum. & Thonn. var. *capitatum*, DB 631

## VIOLACEAE

- Rinorea arborea* (Thouars) Baill., DB 654, DT 3665,  
 JL 296  
*R. aff. arborea* (Thouars) Baill., DT 3894  
*R. ferruginea* Engl., DB 609, DB 622, DB 652, JL 185  
*R. ilicifolia* (Welw. ex Oliver) Kuntze var. *amplexicaulis*  
 Grey-Wilson, DT 3691  
*R. subintegritolia* (P. Beauv.) Kuntze, DT 3634, DT  
 3938, JL 223

## VITACEAE

- Cissus producta* Afz., DB 614  
*Rhoicissus revoilii* Planchon, DT 3720

## ANGIOSPERMAE, MONOCOTYLEDONS

## AGAVACEAE

- Dracaena laxissima* Engl., JL sn  
*D. usambarensis* Engl., JL 181

## AMARYLLIDACEAE

- Scadoxus multiflorus* (Martyn) Raf., JL sn

## ARACEAE

- Amorphophallus* sp., JL sn  
*Callopsis volkensii* Engl., Carmichael 127  
*Culcasia falcifolia* Engl., JL sn  
*C. orientalis* Mayo, JL sn

## BURMANNIACEAE

- Gymnosiphon usambaricus* Engl., JL 298

## CYPERACEAE

- Cyperus pseudoleptocladus* Kükenthal, DT 3897A  
*Scleria iostephana* Nelmes, DB 613  
*S. racemosa* Poiret, DB 619

## GRAMINEAE

- Coelachne africana* Pilger, DT 3935  
*Leptaspis cochleata* Thwaites, JL sn  
*Olyra latifolia* L., JL sn  
*Puelia olyriformis* (Franch) Clayton, DT 3722

## IRIDACEAE

- Gladiolus rupicola* Vaupel, DT 3706

## LILIACEAE

- Asparagus asparagoides* (L.) Wight, DT 3704

*Chlorophytum sparsiflorum* Baker, DB 608  
*C.* sp., DT 3892, DT 3893

MARANTACEAE

*Marantochloa leucantha* (K. Schum.) Milne-Redh., DB 615, RP 5127

ORCHIDACEAE

*Bulbophyllum concatenatum* Cribb & P. Taylor, DB 590

*B. cf. imbricatum* Lindl., DT 3876

*Cheirostylis lepida* (Reichb. f.) Rolfe, DB 589, DT 3647, DT 3700

*Cynorkis anacamptoides* Kraenzl., JL 304

*C. buchwaldiana* Kraenzl. subsp. *braunii* (Kraenzl.) Summerh., DT 3763

*C. pleistadenia* (Reichb. f.) Schltr., JL 303

*Disperis elaphoceras* Verdc., DT 3682A

*D. uzungwae* Verdc., JL 270

*Habenaria trilobulata* Schltr., JL 277

*Liparis* sp. ?nov., DT 3874

*Polystachya cultriformis* (Thou.) Spreng, DT 3875

*P. ?goetzeana* Kraenzl., DT 3873

*P. melantha* Schltr., DT 3872

*P. transvaalensis* Schlechter, DT 3768, DT 3812, JL 302

*P. ulugurensis* Cribb & Podz., DT 3793

*Stolzia leedalii* Cribb, DT 3871

*S. nyassana* Schltr., DT 3870

*Tridactyle* sp. nov., DT 3763A

*T.* sp. nov. = Leedal 6138, DT 3764

PALMAE

*Elaeis guineensis* Jacq., JL sn

*Phoenix reclinata* Jacq., JL sn

SMILACACEAE

*Smilax kraussiana* Meisen., JL sn

TRIURIDACEAE

*Seychellaria africana* Vollesen, DB 634, JL 226

ZINGIBERACEAE

*Aframomum angustifolium* (Sonn.) K. Schum., JL sn

*A. laxiflorum* Loes ex Lock, JL 228

*Costus subbiflorus* K. Schum., JL sn